United States Department of Agriculture

Eastside Restoration Project

Biological Assessment

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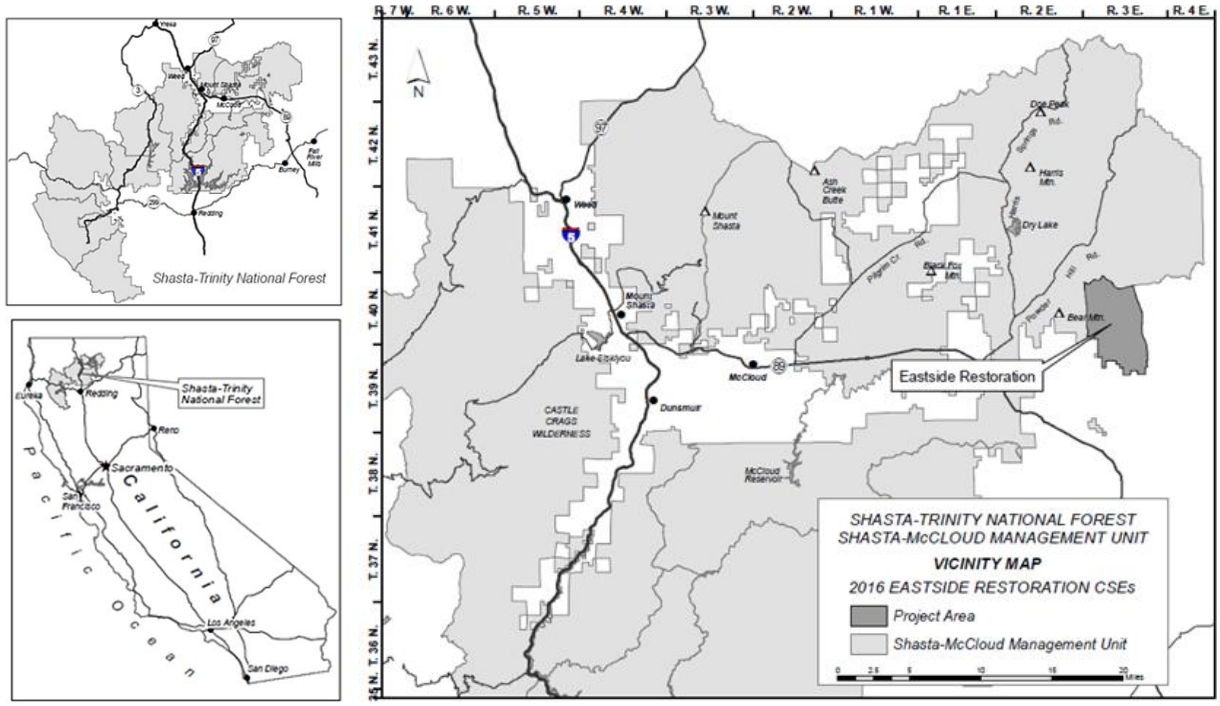
Introduction

The Shasta-Trinity National Forest proposes the Eastside Restoration Project. The project is located approximately 23 miles east-northeast of McCloud, CA, east of Bear Mountain and south of Hambone Butte in all or portions ofT40N R2E S 1, 12-13, 24-25; T40N R3E S 3-10, 15-22, 27-34; T39N R3E S 3-6 Mount Diablo Meridian (see Figure 1). The action area is comprised of pine dominated and mixed conifer/black oak stands, pine plantations, meadows, and aspens. Between intermittent and ephemeral streams, seasonally wet meadows, stock ponds and small man-made lakes and ponds, open water sources are available throughout the year in the project area. Two separate powerline corridors containing three 500-kV power lines cross the action area.

The purpose of this Biological Assessment is to address the potential effects of the proposed action to the federally listed gray wolf (*Canis lupus*).

Silvicultural activities are expected to take about 3 years once started. Within 10 years, all silvicultural activities would likely be completed. Fuel treatment activities are expected to occur as soon as an area's silvicultural activities are completed and available but may not take place for 1 to 3 years after silvicultural activities completion. Follow-up prescribed burning will occur as needed to maintain the historical fire return intervals and to maintain the desired conditions.

Figure 1. Area and location map of the Eastside Restoration Project, Shasta-Trinity National Forest.



Background

In accordance with Section 7(c) of the Endangered Species Act (ESA), a list of the listed and proposed threatened or endangered species that may be present in the action area was requested from the U.S. Fish and Wildlife Service (USFWS) for the action area (Table 1). Action area means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402 et seq). In the Eastside Restoration project area the action area is based on a one-mile buffer of the project area. All project treatments will occur inside the project area boundary. On September 24, 2020, The Shasta-Trinity National Forest (Forest) requested an official species list of threatened, endangered and proposed species for the action area from the U. S. Fish and Wildlife Service (FWS) Information for Planning and Consultation (IPaC) (IPaC website https://ecos.fws.gov/ipac/) (Consultation Code: 08EYRE00-2020-SLI-0023). There were thirteen wildlife species on the IPaC list (Table 1). In accordance with the Endangered Species Act (ESA) and regulatory guidance, only those organisms and critical habitat listed on the official species list, and only those species under the regulatory jurisdiction of the FWS, are considered.

ESA Determinations for this Biological Assessment

Federal agencies are required to determine whether their actions may affect listed or proposed resources (species and designated and proposed critical habitat). "*May affect, but not likely to adversely affect"* determinations require written concurrence from the USFWS (USFWS 1998). A "*No effect"* determination does not require concurrence from the USFWS (USFWS 1998).

- ***"May Affect, Not likely to adversely affect"***- appropriate conclusion when effects on listed species are expected to be discountable, or insignificant, or completely beneficial.
    - **Beneficial effects** are contemporaneous positive effects without any adverse effects to the species.
    - **Insignificant effects** relate to the size of the impact and should never reach the scale where take occurs.
    - **Discountable effects** are those extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur.

- **"*No effect"*** – the appropriate conclusion when the action agency determines its proposed action will not affect listed species or critical habitat.
    - This means there will be no impacts, positive or negative, to listed or proposed resources, and that no listed resources will be exposed to action and its environmental consequences.
    - There are no beneficial, insignificant, or discountable effects.

Table 1. The Forest Service rationale and determination for species identified on the IPaC list.

Species	Status	Determination and Rationale
Amphibians		
California red-legged *(Frog Rana draytonii)*	Threatened	**No effect:** the action area is outside this species range and there is no perennial riparian habitat.
Oregon Spotted Frog (*rana pretiosa)*	Threatened	**No effect:** the action area is outside this species range and there is no perennial riparian habitat.
Birds		
Northern Spotted Owl (NSO) (*Strix occidentalis caurina*)	Threatened	**No effect:** Five years of protocol survey with no detections in the action area; no suitable habitat (nesting/roosting, foraging) in the action area to support a breeding pair, historical vegetation types in the action area were not suitable for the owl, and approximately half the action area is outside the known range of NSO (Wood and Bowers 2020).
Yellow-billed Cuckoo *(Coccyzus americanus)*	Threatened	**No effect:** There is no contiguous, multilayered perennial riparian habitats for nesting and outside the known breeding range.
Mammals		
Gray Wolf *(Canis lupus)*	Endangered	**May Affect, Not Likely to Adversely Affect**
North American Wolverine (*Gulo gulo luscus*)	Threatened	**No effect:** no habitat, requires deep persistent spring snow for year-round occupancy and reproduction in the action area. No observations of species in action area.
Fishes		
Delta Smelt *(Hypomesus transpacifius)*	Threatened	**No effect:** The action area is outside the known and expected range of this species. Contains no suitable habitat or critical habitat (brackish estuaries).
Longfin Smelt *(Spirinchus thaleichthys)*	Candidate	**No effect:** The action area is outside the known and expected range of this species and contains no suitable habitat or critical habitat (brackish estuaries).
Insects		
Valley Elderberry Longhorn Beetle *(Desmocerus californicus)*	Threatened	**No effect:** The action area is outside the known and expected range. They have never been documented on the Management Unit (USDI-FWS 1999 p. 13; NRIS 2020).
Crustaceans		
Conservancy Fairy Shrimp *(Branchinecta conserbatio)*	Endangered	**No effect:** The action area is outside the known and expected range. They have never been documented on the Management Unit.
Shasta Crayfish *(Pacifastacus fortis)*	Endangered	**No effect:** There is no perennial riparian habitat to provide constant, steady, and current water to survive.
Vernal Pool Fairy Shrimp *(Branchinecta lynchi)*	Threatened	**No effect:** They were thought to occupy suitable lake habitat in the Porcupine watershed area (USDA-FS 2003), subsequent surveys revealed that this species was not present (Rogers and EcoAnalysts 2008).
Vernal Pool Tadpole Shrimp *(Lepidurus packardi)*	Endangered	**No effect:** They were thought to occupy suitable lake habitat in the Porcupine watershed area (USDA-FS 2003), subsequent surveys revealed that this species was not present (Rogers and EcoAnalysts 2008).
Critical Habitat - *there is no designated critical habitat for any listed species within the action area*		

Proposed Action

The Shasta-Trinity National Forest is proposing actions to improve wildlife habitat and timber stands, and restore seasonal wetlands, streams, and riparian areas on approximately 13,575 total

acres, as summarized below. Treatment areas will receive a combination of treatments to achieve the purpose and need such as thinning followed by prescribed burning,

Wildlife Habitat Improvement Activities

- Remove encroaching conifers from approximately 245 acres of aspen and 415 acres of meadow.
- Thin approximately 1,405 acres of black oak/conifer woodland stands.
- Remove trees along the edges of the powerline corridor to create an undulating edge within approximately 180 acres.

Timber Stand Improvement Activities

- Thin approximately 3,085 acres of plantations, 4,785 acres of pine-dominated natural stands, and 3,285 acres of mixed conifer natural stands.
- Prescribed burn of approximately 13,565 acres of aspen, meadows, oak, plantations, and natural stands. Masticate, machine pile, and use other mechanical treatments as pretreatment before under burning to limit impacts to remaining stands from prescribed fire.
- Construct fire containment lines along private property and around sensitive resources and rehabilitating them post use.
- Thin approximately 1,075 acres along powerlines and 1,340 along primary fire suppression access roads to a low tree density.
- Redistribute topsoil from windrows amid plantation trees.

Wetland, Stream and Riparian Area Activities

- Remove soil from two abandoned railroad grades that impede surface and subsurface drainage at upper and lower Sand Flat Well meadow.

Common to Wildlife and Timber Stand Improvement and Wetland, Stream and Riparian Area Activities

- Retain all remnant trees[1] unless deemed a hazard.
- Retain some trees with decadence and defects such as forks, sweeps, crooks, cankers, etc.
- Cut hazardous trees for operational safety.
- Radial release hardwood species such as black oak and aspen.
- Apply a borate compound to cut conifer surfaces that are 14 inches in diameter and larger.
- Maintain existing National Forest System roads.
- Use approximately 12-15 miles of existing unauthorized routes temporarily and decommission after use.
- Construct up to 1 mile of temporary spur road. These temporary spurs will also be decommissioned after use.

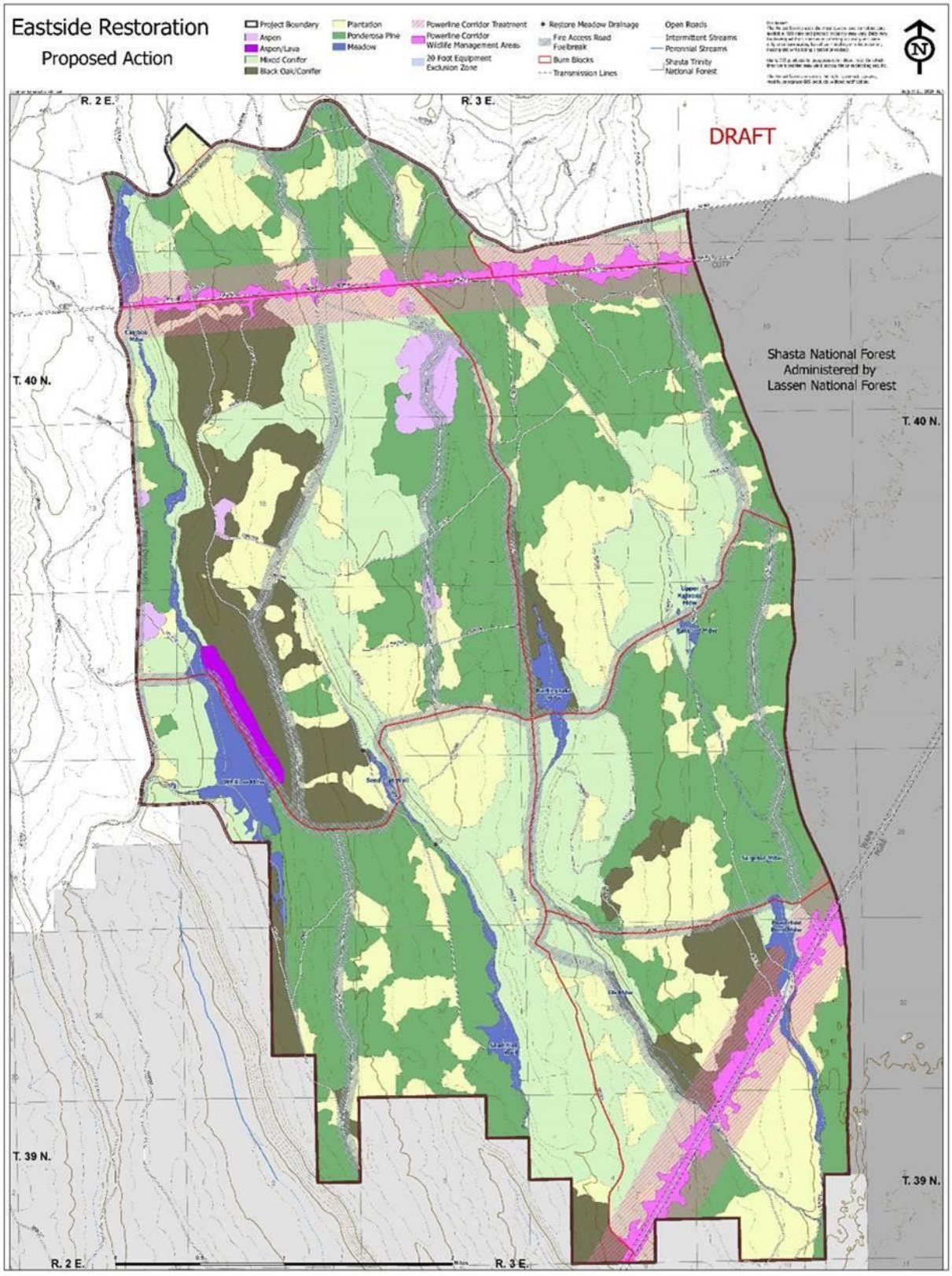
The project includes resource protection measures and standard operating procedures to minimize or eliminate effects to resources.

[1] Remnant Trees are trees that remain from a previous management activity or catastrophic event. The tree is significantly older than the surrounding vegetation. Remnant trees do not form a canopy layer and are usually isolated individuals or small clumps. (CSE R5 Guide).

Treatments are planned for the entire the action area, though treatments would not all occur at one time. Project activities are expected to be conducted over time and over different areas within the action area. Implementation is expected to take place over approximately 3-4 implementation phases. Each phase will treat a variety of vegetation types to improve both wildlife habitat and timber stands while reducing the risk of wildfire to the action area. Opportunities for learning from treatment effectiveness and on-going monitoring is a part of the implementation plan.

Silvicultural type activities (e.g. like an integrated resource timber sale contract) are expected to take about 3years once started. Within 10 years, all silvicultural activities would likely be completed. Fuel treatment activities are expected to occur as soon as an area's silvicultural activities are completed and available but may not take place for 1 to 3 years after silvicultural activities completion. Follow-up burn entries will occur as needed to maintain the historical fire return intervals and to maintain the desired conditions. If treatments on the ground need to vary substantially from what is presented in this document, the agency will evaluate whether additional NEPA analysis is needed prior to implementing such actions.

Figure 2. Eastside Restoration Project Treatment Map. *The project boundary (black line) is the project area.*



Existing Environment

Soils

Eastside soils are rated moderate to fair showing these soils have limited productivity for timber (Rust 2020). Soil productivity ratings do show these soils produce moderate to high levels of biomass of brush, chock-cherry, manzanita, ceanothus, etc. due to limited water, depth of soil, and limited available water holding capacity of the soils (Rust 2020). Precipitation ranges from 20 to 30 inches annually due to the rain shadow effects of Mt. Shasta (Rust 2020). The volcanic soils in the project area are at risk if a high intensity fire consume organic matter (litter, duff, Large Woody Debris (LWD), and soil mycorrhizae) (Rust 2020).

Vegetation[2]The 1800's railroad logged in the area, resulted in large clearcuts left to natural regeneration. Wildfires burned other stands that along with clearcuts came up as brush fields. Natural forest regeneration was halted or slowed in brush dominated areas with somewhat droughty soils. The preferred method of brush removal became windrowing brush with tractors and then burning the windrows to allow for successful tree planting.

The project area includes plantation that were created using windrows to produce timber. The following excerpt is from the soils report (Rust 2020). "In many cases these areas were too thick in brush and somewhat droughty soils that natural forest regeneration was halted or slowed. The exception was Ponderosa Pine that tolerates moderately droughty soils. S.B. Show (PSW silivaculturalist) in the 1920's experimented with burning and clearing brush to plant Ponderosa Pine to test the survivorability of this species in dry climates. Ponderosa Pine performed well especially when competing brush was burned to reduce competition. Later the preferred method of removal became windrowing brush with tractors and then burning the windrows. Typically the topsoil was scalped from 3 to 8 inches so as to remove burls and seed sources. Since the 60's thousands of acres was planted with pines filling in the brush fields between relict mixed conifer stands. The practice was stopped in the late 1980's due to chemical herbicides, masticators, and rototillers making windrowing obsolete and too expensive."

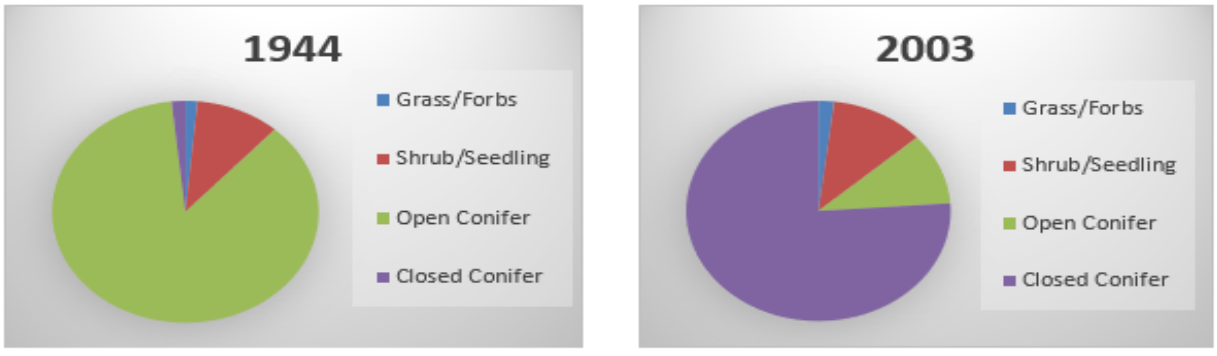


Figure 3. Vegetation percentages over time

[2] Existing Vegetation information in this BA from the Swell et. al. 2020 Eastside Restoration Project-Silvicultural Memorandum.

All forest type delineations are human-imposed breaks in an ecological continuum. However, for management purposes it is very useful to have relatively homogenous areas where a prescription can be implemented. Mixed conifer forests cover a spectrum of site conditions, from warm, dry ponderosa pine forests to wet, cold spruce-fir forests. Many managers break this continuum into a warm–dry mixed conifer type and a cool–moist mixed conifer type, as described in Table 1. "It's not argued that mixed conifer hasn't always been a component on the landscape and in particular in this project area. It's the condition of these mixed conifer stands that are the concern. Ecosystems maintained by surface fires such as ponderosa pine and drier mixed types are a result of fire tolerant successional species that are generally shade intolerant. In the absence of fire, beyond the normal return interval, these fire-adapted species are replaced by late-successional species that are predominately shade tolerant thus producing the development of fuel ladders that alter fire behavior and effects (porcupine watershed analysis 4-10). The treatments through species selection and residual stocking levels are meant to enhance the historical more open condition focusing on the removal of the encroaching shade tolerant species" (C. Sewell, personal communication, September 8, 2020).

Table 2. Subdivisions of Mixed Conifer Forest (Smith et al 2008)

Forest Type	Fire Regime	Early Seral Species	Late Seral Species
Warm-Dry Mixed Conifer	Relatively frequent/ low to moderate intensity	Ponderosa pine with subdominant aspen and/or oak	Ponderosa pine with subdominant Douglas-fir
Cool- Moist Mixed Conifer	Relatively infrequent/ intensity variable from low to high	Aspen or Douglas-fir	White fire and blue spruce

One of the overarching silviculture concerns for Eastside is the densification of the stands over time (Sewell, et. al. 2020). Forest stands and other areas in the project area have experienced an increased density of conifers. This comparison showed that the stands went from a more open stand condition, to a much more closed stand condition (Figure 3), which is thought to be in part due to management actions, such as converting open poorly stocked areas such as dry meadows and bush fields into plantations, reduced harvest activities over the recent decades, as well as fire suppression (Figure 3). Where needed, thinning in the natural stands will increase species and age diversity and would also decrease bark beetle risk and enhance the general resilience of the forest through the next drought (Cynthia Snyder personal communication July 10, 2019).

Riparian Habitat

No natural perennial water sources exist in the action area, but two to four artificial precipitation dependent ponds may hold some useable amount of water into the fall and may persist throughout the year. When livestock allotment was active, permittees had to haul water to supplement natural sources (USDA 2003). The two mitigation powerline ponds created under the southern lines are the largest of these ponds. Precipitation averages less than 30 inches annually and the volcanic soils of the watershed are very permeable limiting available surface water (USDA 2003, Rust 2020).

Riparian habitat in the action area is typified by meadow systems that generally run northwest to southeast along the base of escarpments and lava rims (USDA 2003). There is no direct surface flow from the action area to any of the streams and rivers outside the action area (Mai 2019); therefore, there will be no effects to water quality or quantity downstream of the action area. Portions of the meadows are seasonal wetlands, which flood annually and fluctuate in extent significantly, both annually and seasonally (Mai 2019). Most of these water bodies dry up completely each year providing more of a vernal pool environment (Mai 2019).

Human Activity in Action Area

The public can access the project area from the western and northern sides via paved roads, and unpaved roads crisscross the project area that are accessible to all vehicles year-round, when excessive snow is not present (USDA 2012). The action area experiences variable amounts of human activity levels throughout the year.

Deer hunting and mushroom gathering are the two popular recreational activities undertaken by the general public (USDA 2003). Fuelwood gathering occurs in the spring with road access and throughout the summer primarily in areas of lodgepole pine (USDA 2003; USDA 2015). In 2019, 482 personal mushroom permits for the McCloud ranger district for the gathering season, which is typically May to mid-July depending on the weather. (SHF TIM report, 2019). In the spring, most of the mushroom collecting is done by local residents (USDA 2003). During the fall, many commercial mushroom collectors come to McCloud ranger district (USDA 2003). Charge permits are issued for this use. Approximately 800 to 1000 commercial use mushroom permits are issued for mushroom collecting each year (USDA 2003).

Dispersed camping starts in the spring/summer and increases into the end of the fall hunting season. Deer hunting occurs from mid-August to the end of October, with day visits to area and camping prior to the start of the season (USDA 2003). Winter recreation use is limited to snowmobiling. In the watershed, there are approximately 20 miles of groomed snowmobile trails (USDA 2003). Snowmobile trails are located on forest system roads that do not have snow removal during the winter months (USDA 2003).

Transmission Corridors

There are two transmission corridors that cross the action area and cause another additive amount of disturbance in the action area (S. Smith, pers. comm. 2020). Three transmission companies: Pacific Gas & Electric Company (PG&E), Transmission Agency of Northern California (TATC), and Western Area Power Administration (WAPA) all monitor their powerlines annually but often that is via air (helicopter or plane). For ground monitoring of powerlines, a minimum of 10 days a year or less for routine annual work and if there is substantial hazard tree removal or structural repairs, that number would increase in the localized area for the duration of the work which is pretty variable depending on the project. Typically, in the spring the power companies enter the area in pickup trucks driving the access roads inspect their tower and power lines and line up what work has to be done that year. For annual maintenance treatments, WAPA and TANC try to do their tree removal work in later summer into the fall. PG&E maintenance actives are inconsistent and operate all summer. Rarely are they out in winter except for emergency repairs. In those instances, they fly the line and then use snowcats to access the repair sites.

Status of Gray Wolf

Appearance

Gray wolf pelage ranges from white, to tawny gray, to black, or any combination of those colors. Approximately half of any gray wolf population actually is gray. Adult male gray wolves typically weigh between 90 and 110 pounds and may exceed 5-1/2 feet in length from nose to tail tip. Adult females typically weigh between 80 and 90 pounds and can be 5-feet long. Pups are born with black spots on the upper outside of their tails, which may fade with age.

Reproduction

Female wolves begin to bear young when they are about 2 years old. Breeding usually occurs only between the dominant male and female in a pack, with the breeding season peaking in mid- to late- February. Pregnancies last for two months and usually result in a litter of three to five young, called pups. All the adults in a pack share in the raising of pups. Wolf packs generally range in size from 3 to 19 wolves.

From approximately April 1 through July 15, pack activity is centered near the den or at one or more rendezvous sites in close proximity to the den as the adult wolves hunt and return with food for the pups. Gray wolves excavate natal dens in well-drained soils in meadows near water (Herman & Willard 1978). After 1 to 2 months these natal dens are abandoned for an open area called a rendezvous site. Rendezvous sites typically are discovered in meadows or forest openings near the den but can be several miles away as pups become more mobile. Adults carry small pups between the rendezvous sites, where the pups stay until they are able to travel and hunt with the pack, which usually occurs by September. Denning wolves are most vulnerable to humans disturbance and other large predators during the denning- rendezvous season because activities are centered these locations (Jędrzejewski et al. 2001). Adult and young survival of both may be severely affected if these sites are discovered. These sites are often situated far from sources of human disturbance (Person and Russell 2009). Current road density in the watershed is approximately 3.3 miles of road per square mile of land (USDA 2003).

Habitat

Wolves are habitat generalists and will establish territories anywhere there is a sufficient food source (primarily large ungulates). Gray Wolves usually occur in areas with few roads and human disturbance (Thiel 1985, Mech et al. 1988, Mech 1989). When setting out to establish new territories, young male wolves disperse an average of 50 to 60 miles from their source pack, and females disperse an average of 40 miles. However, dispersals of more than 500 miles have been reported. There is no critical habitat designated for gray wolf in California.

The most limiting feature on the landscape for the gray wolf are sites that have low levels of human disturbance during the pup rearing season. These sites are referred to here as security habitat. The pup rearing season begins with the establishment of a den site for pup litters in the spring, and extends into the mid-summer and fall, when wolves may establish rendezvous sites as older pups become more mobile. Due to the generalist habitat requirements of wolves, resource protection measures for physical habitat features and for transient individuals are not necessary. What is necessary to assist in the recovery of the gray wolf are LOPs that establish

security habitat for active pup rearing by restricting human disturbance in the vicinity of active den and/or rendezvous sites. Wolf pups are vulnerable during the early breeding season before they are fully mobile (DelGiuduce et al. 1991, 1989 and Claar *et al*. 1999), and pup survival is documented as the most important demographic parameter for influencing wolf population growth.

Territory

Pack boundaries and territory sizes vary from year to year depending on changes in prey availability, distribution, conflict with nearby wolf packs, or the establishment of a new neighboring pack. On the Lassen NF, area of use by the Lassen Pack includes approximately 500 square miles (K. Laudon, personal communication, August 10, 2020).

Food

Wolves are opportunistic carnivores whose primary prey is deer, elk and moose. When this prey is not available, wolves will eat smaller animals such as rabbits, beavers, grouse, ravens, skunks, coyotes, porcupines, eagles and fish. Wolves also may kill and feed upon domestic livestock such as cattle, sheep, llamas, and goats. When necessary, wolves also will eat insects, nuts and berries.

Population Status

Since their return to Northern California, the population status of gray wolves has been monitored by the California Department of Fish and Wildlife. Information is updated quarterly or more frequently, as needed. Figure 3 is current through July 2020.

Figure 3. Approximate Area of Gray Wolf Activity, July 2020. This map displays the approximate boundaries of known resident California wolf territories based on the best data available from the California Department of Fish and Wildlife (CDFW) (e.g., tracks, trail camera images, confirmed sightings, and GPS collar data). The locations of dispersing wolves are not included, as dispersing wolves travel widely, and their movements are unpredictable.

Population Status in Northern California

Starting in the fall of 2011, OR7 was the first recorded gray wolf to disperse or travel into Northern California (CDFW 2020 b). Since 2015, the gray wolf has recolonized portions of Northern California and its population has been steadily increasing since the first known wolf pack was confirmed on the Shasta-Trinity NF in 2015 and Lassen NF in 2017 (CDFW 2020

b). In California, there are also dispersing wolves that travel widely, and their movements are unpredictable.

Shasta Pack

The Shasta Pack was California's first known contemporary pack and occupied a portion of eastern Siskiyou County (CDFW 2020 b). The pair was first detected in early 2015 and 5 pups were identified that summer (CDFW 2020 b). The pack was regularly detected from August through November 2015 and consisted of a minimum of six wolves in late November 2015 (CDFW 2020 b).

The pack was not detected after November 2015, except for one yearling identified within the pack's range in May 2016. The same animal, verified by DNA, was detected in northwestern Nevada in November 2016 (CDFW 2020 b).

A dispersing wolf was reported in the action area of the Eastside Restoration project area in 2017, but there are no known wolf packs established on the Shasta-Trinity National Forest at this time. While active, the range of the Shasta Pack may have overlapped with the action area, but pup rearing sites were never established in or within one mile of the action area. The current location and status of that Shasta pack is unknown (CDFW 2020 b). No new observations or data collected in the last 5 years indicate that pup rearing is occurring in or near the action area. In July 2017, there were two possible wolf sightings of individual transient wolves in the analysis area. One sighting was caught on a Forest Service camera trap and another was personal observation within the action area above Mayfield Road. Presently, the closest active wolf pack is on the Lassen National Forest.

Currently, there is no known pup rearing activity on the Shasta-Trinity National Forest (STNF) (last updated for November 2020 https://wildlife.ca.gov/Conservation/Mammals/Gray-Wolf).

Lassen Pack

The Lassen Pack is California's second contemporary pack, and the only currently known wolf pack in the state (CDFW 2020 b). The wolves generally utilize a broad area of western Lassen and northernmost Plumas counties, and the pack's home range is approximately 500+ mi^2. The pack has produced litters in 2017 (four pups), 2018 (five pups), 2019 (four pups), and 2020 (eight pups). One of the 2019 pups (LAS02F) was fitted with a satellite tracking collar in September 2019, but that collar failed in January 2020 (CDFW 2020 b). A male from the 2019 litter (LAS03M) was fitted with a satellite collar in May 2020 and is currently one of two functioning collars in the pack (CDFW 2020 b).

Genetic analysis indicated the original male was a 2014 offspring of southwestern Oregon's Rogue Pack (CDFW 2020 b). While he sired the 2017-2019 litters, he has not been detected with the pack since spring 2019 (CDFW 2020 b). A black-colored adult male began traveling with the pack as early as June 2019, and genetic analysis of 2020 pup scats show the black wolf is the new breeding male (CDFW 2020 b). He is not related to other known California wolves, and his origin is currently unknown (CDFW 2020 b).

The pack's breeding female (LAS01F) is not related to known Oregon wolves and genetic analysis indicates she likely dispersed from some other part of the northern Rocky Mountain wolf population (CDFW 2020 b). LAS01F was originally tracked with a GPS collar from June 2017 until it failed in November 2019. She was recollared in June 2020 (CDFW 2020b).

In September 2018, a yearling female from the pack was found dead, and the matter remains under investigation (CDFW 2020 b). In summer 2020, the pack consisted of a minimum of six adult/yearling wolves and eight pups (CDFW 2020 b).

Deer and Elk Populations

The deer population in action area is considered stable to slightly declining, yet considerably below levels seen in the late 1960's,1970's, and 1990's (Thiel 1985; Mech et al. 1988, CDFG 1998, CDFW 2020a). Deer in this area generally move to the action area in early May and will remain until the first heavy fall storms force them down below the snow line (CDFW 2020 a). Degraded habitats are identified as the leading cause for low deer population levels (CDFG 1998). Typically, lower densities of deer are observed in the more densely forested areas or in older, more decadent brushlands (CDFW 2020a). Both these conditions existed in Eastside Restoration (Swell et. al. 2020). These long-term declines have been due to land management practices that have precluded fire, resulting in changes toward more mature and less diverse habitats, and reduced quality and quantity of deer habitats (CDFW 2020a). Short-term fluctuations in deer populations are usually attributed to weather events that affect forage production (CDFW 2020a).

Elk migrate from Shasta Lake or southern areas into Porcupine watershed for summer range (UDSA 2003). Elk concentrate in riparian areas and forest edge habitats near meadows (USDA 2003). An estimated one hundred elk use the meadows in the southern half of the watershed (UDSA 2003). Elk herds in the action area are stable and not increasing (CDFW 2017). Herd size is below carrying capacity for the region due to habitat conditions (CDFW 2017). Enhancing early seral vegetation is critical to increasing elk populations (CDFW 2017). Disturbances such as low intensity fire or habitat improvement projects within forested communities, can promote a mix of habitat types and successional stages, including forest openings and meadows that benefit elk (CDFW 2017). High road densities and human activity can limit elk use in the watershed, displacing elk from meadows (Smith and Murphy, 1973; Ciuti et. al 2012).

Analysis of Effects and Project Design Criteria

Analysis for effects of the proposed action is being considered within a mile buffer around the project boundary. The selection of a one-mile buffer is based on the following discussion.

Wolf pups are vulnerable during the early breeding season before they are fully mobile (DelGiuduce et al. 1991, Mech 1989 and Claar *et al*. 1999), and pup survival is documented as the most important demographic parameter for influencing wolf population growth (Trapp *et al*. 2008, Ausband *et al*. 2010, Benson *et al*. 2015). Pack activities are centered at the den site in the

early breeding season of March through June, with pups born from April to mid-May. Activity is centered at or near rendezvous sites until September to mid-October. During the pup-rearing period, alpha females and pups typically remain near the den (Benson *et al*. 2015, Ausband *et al*. 2010). Accordingly, 'early season' rendezvous sites that are used from April through August are usually located within one mile of den sites (Bangs *et al*. 1996, Schullery 1996, Mech and Boitani 2003, USDI-USFWS 2011). Den sites are based on small-scale habitat features that are not easily identified at the larger landscape scale. Rendezvous sites are more easily identified at the landscape scale because of the areas that are used in proximity to perennial water, such as dry or wet meadows (Ausband *et al*. 2010, Iliopoulos et al 2014, Benson *et al*. 2015). Depending on available resources, wolves may relocate pups to a new rendezvous site or continue to use the original den as a rendezvous site.

There are numerous studies on den site selection and response of wolves to human disturbance and other factors (temperature, water availability) during the denning period, including movement of pups. Wolves are known to compensate for their intrinsic vulnerability during this period by selecting areas with low human activity or adjusting their temporal use in response to human activities. While some wolves will tolerate limited human disturbance of dens including when pups are younger than six weeks and will regularly continue using disturbed den sites in subsequent years (Thiel *et al*. 1998, Frame *et al*. 2007, Person and Russell 2009), other wolves will abandon their dens and move their pups (Ausband 2016, DelGiuduce et al. 1991). Relocating a den can present elevated risks to pups from environmental factors such as inclement weather or other predators, due to their vulnerability. Also, during the pup-rearing season, when large carnivores are more vulnerable, wolves are expected to strengthen avoidance behavior from humans (Sazatornil *et al*. 2016). Given these factors, a vegetation management activity may affect wolves if it occurs within one mile of a den site during the pup-rearing season.

There are fewer disturbance concerns near rendezvous sites because pups are more mobile, these sites are ephemeral, and wolves appear to be more tolerant of human disturbance at these sites (Benson *et al*. 2015). Resource selection for rendezvous sites also varies as the pup-rearing season progresses given the temporal variation in pup mobility, the nutritional demands of the female and the pups, and the prey selection shifts from spring to fall (Packard 2003, Forbes and Theberge 1996, Metz *et al*. 2012). As several areas could be used as rendezvous sites throughout a breeding season, it is difficult to determine where these areas might be in advance to effectively implement conservation measures. However, coordination with CDFW would help to determine if the sites are being used and help inform the Forests about measures to reduce impacts to wolves when presence is confirmed.

If a den site is detected in or near a treatment area during implementation, all above-ambient noise and smoke-generating activities will be restricted within one mile of the den site from the time of detection through June 30. Early rendezvous sites are typically near dens (generally one mile or less) and implementing this seasonal restriction within one mile of den sites will generally eliminate or reduce the potential for direct or adverse effects to early rendezvous sites when wolf pups are still vulnerable.

While the den site seasonal restriction above is expected to provide protection from any prolonged or substantial project-related disturbance during the critical pup-rearing period at early

rendezvous sites, the seasonal restriction for activities within one mile of active (during project operations year only) rendezvous sites is from April 1 through August 31 will also be implemented. Further discussions and coordination with the USFWS may result in modified distances, or more flexible dates, for these seasonal restrictions.

These project design criteria are designed to reduce direct disturbance at den or rendezvous sites to a discountable level, and if implemented as described, the risk of adverse effects to gray wolves is insignificant. Individual projects may also be designed with conservation measures that protect or maintain potential rendezvous site habitats. Seasonal restrictions may be modified based on site-specific circumstances if wolf den or rendezvous site(s) are confirmed within one mile of an ongoing project. Distances or dates for the seasonal restrictions may be adjusted based on site-specific information (e.g. topographic features or terrain that clearly separates the noise- or smoke-generating activity from the den or rendezvous site(s), or other factors). Any rationale for variations will be agreed upon by the Forest(s) and the USFWS.

Human Disturbance

The likelihood of wolves denning or establishing rendezvous sites in or within one mile of the project area is low due the absence of security habitat as a result of human disturbance in and within one mile the project area, high roads densities, and activity in and on all sides of the project area and the absence of security habitat.

Security habitat essentially provides seclusion from human disturbance, and motorized roads and trails are a predictor for human-wolf interaction. Security habitat is often described in terms of road density as numerous studies show there is a negative correlation between road density and suitable wolf habitat (Thiel 1985, Mech et al. 1988, Mladenoff et al. 1995, and Wydeven et al. 2001). Road density appears to affect many species of larger wildlife (e.g. Gray wolf) when it exceeds 0.22-miles per square mile (<0.58 kilometers per square kilometer) (Mech 1989). Fragmentation decreases the availability of undisturbed habitat or security habitat for species like wolves (Jędrzejewski et al. 2001). Across the Eastside Restoration project area the road system causes fragmentation of natural habitats.

Approximately one hundred and fifteen miles of roads exists within or provide access to the Eastside Restoration Project area (Sarmiento 2019). The current road density in the project area is 5 miles per square mile (13 kilometers per square kilometer) (Sarmiento 2019).

Several forms of human disturbance occur in the project area, including utility maintenance, hunting, camping, and gathering. Mushroom gathering occurs in May to mid-July and coincides with the denning season for pup rearing wolves. Firewood gathering begins in early spring and continues throughout the summer and fall. Although the hunting season is later in the fall, hunters scouting deer trails, meadows, and water sources would likely be visiting these features in the project area in advance of the hunting season during the same period when wolves would require rendezvous sites in the latter portion of the pup rearing season. Dispersed camping in the summer would also deter wolves from selecting the project area for pup rearing. Snow mobiling in the winter may deter wolves from selecting the project area for pup rearing even before the denning season begins. Outside of emergency maintenance in the winter, utility maintenance

occurs in the spring, and coincides with the denning stage, the most vulnerable stage of pup rearing for wolves. Driving pickup trucks through the project area, inspecting and maintaining power lines, and removal of hazard trees are all activities that would increase human presence and create noise levels that would deter wolves from selecting the area for denning, and subsequently for rendezvous sites.

As a consequence of these human disturbances, it is unlikely that wolves would select the action area for suitable denning or rendezvous sites due to inadequacy of security habitat in the project area and the availability of better security habitat elsewhere. Security habitat protects the pups from both wild predators and human disturbance. Wolves are habitat generalists requiring common landscape features such as meadows with permanent water sources, and with low levels of human disturbance for security habitat. With only one active wolf pack in all of California, it is likely only the best security habitat will be selected such as demonstrated by the Shasta pack when that territory was established further east of the project area in 2015. If wolves do establish a den or rendezvous site in or within one mile of the project area, the seasonal restrictions detailed below will protect them from human, noise and smoke disturbance during critical pupping season. Notwithstanding, even if a pup rearing site is never established in the action area, it still may serve as corridor or foraging habitat over time as project actions improve prey availability.

Prey Availability

The deer population in action area is considered stable to slightly declining (CDFW 2020 a), yet considerably below levels seen in the late 1960's, 1970's, and 1990's (Thiel 1985; Mech et al. 1988, and CDFG 1998). Elk populations are stable but below carrying capacity for region. (CDFW 2017). These long-term declines in deer and elk populations have been due to land management practices that include precluding fire, resulting in changes toward more mature and less diverse habitats, and reduced quality and quantity of early seral habitats (CDFW 2017, CDFW 2020 a). In the action area, the habitat conditions are dominated by mid seral- dense stands (Sewell et. al. 2020; Figure 3).

Wolves are habitat generalists and depend on a stable ungulate prey base. The Eastside Restoration Project goals are to improve habitat conditions for early seral species, including deer and elk, by restoring early seral habitat conditions to portions of the project area that have advanced to mid-seral condition due to fire exclusion. In doing so, over time, wolf prey ability will improve in the action area.

Coordination with USFWS and CDFW

Forest Service biologists have and will continue to coordinate with the U.S. Fish and Wildlife Service and the California State Department of Fish and Wildlife (CDFW) on approximate locations of wolf activity to proactively avoid effects to wolves from land management activities throughout the life of the project. Camera trapping will continue throughout project activities in coordination with CDFW efforts to monitor and locate wolves. The CDFW is continually monitoring and surveying for wolf activity in northern California and have indicated that there is no pup rearing activity within or anywhere near the Eastside Restoration project area (K. Laudon, personal communication, August 10, 2020).

Determination of Consequences

The proposed action will not have consequences on the gray wolf because the best available current scientific information indicates that wolves have not established pup rearing (den and/or rendezvous) sites in or near the action area. In the future, the consequences of a beneficial nature for wolves may develop, as project activities will improve foraging opportunities (prey habitat and prey availability) in the project area even if pup rearing sites are never established in or near the project area. Project treatments will not degrade habitat for the gray wolf because the wolf is a wide-ranging habitat generalist, and habitat across the landscape is not limiting for the species.

If wolves were present, the action area might function as corridor habitat, but wolves may also avoid the area due to the timing and amount of human activity during wolf denning and rendezvous periods. As proposed treatments increase the proportion of early seral habitat in the project area, increased presence of ungulates may attract hunting wolves to the action area. Dispersing or hunting individuals may exhibit avoidance behavior near the project due to noise disturbance or increases in human activity. This effect is not considered to be meaningfully measurable, detectable, or traceable to the project in and of itself, due to wolves' generalist behaviors and wide-ranging habits. This potential effect is considered insignificant.

While denning, wolves are particularly sensitive to human caused disturbances such as loud noise and smoke from fuel actions close to the den sites. In the unlikely event that a den site is detected in or within one mile of the action area during implementation, all above-ambient-noise and smoke-generating activities will be restricted within one mile of the den site with a LOP that runs from the date of detection until August 31, or until the site is vacated, whichever occurs first. The project includes a disturbance Limited Operating Period that will go into effect if a den site or active rendezvous site(s) is detected within one mile of project activities. These measures are expected to minimize the potential for consequences to wolf reproductive behaviors and pup rearing success to an insignificant and/or discountable level. There will be no increase or decrease in habitat that gray wolves, if present, would use for dispersal as a result of the project.
The Forest Service will continue to coordinate with USFWS and CDFW before and throughout project implementation to confirm wolf absence or presence in the action area and the Shasta-Trinity Forest. Seasonal Restrictions will be applied when active pup rearing is confirmed in or within one mile of the project area by CDFW wolf biologist, and appropriate seasonal protection measures would be applied.

The, the final determination for the wolf, is "May Affect, Not Likely to Adversely Affect, because the effects of increasing the deer and elk population in the project area will be beneficial, and insignificant and/or discountable effects may occur if dispersing or hunting individual avoid the project area during implementation." If new information reveals that pup rearing activity is occurring in or within one mile of the project area, seasonal restrictions in the form of limited operating periods (LOPs) that apply to active wolf dens and rendezvous sites would be applied, so that any known active pup rearing site(s) would be protected from disturbance during pup rearing periods and any effects to these behaviors, or individuals, would be reduced to an insignificant and discountable level through the seasonal restrictions. These seasonal restrictions are expected to maintain effects of the proposed activities below the "May Affect, Not Likely to Adversely Affect." threshold.

Seasonal Restrictions Applied to Active Pup Rearing Sites

1) If suspected wolf activity is identified during project implementation, the appropriate CDFW and USFWS points of contact under the Federal/State Coordination Plan will be notified as soon as possible and a determination will be made if this activity indicates an active den or rendezvous site is within one mile of the project area. In addition:

- If an active den site is detected in or near the project area during the project implementation timeframes, a seasonal restriction that restricts vegetation management activities, above ambient noise- and/or smoke-generating activities within one mile of the den will be implemented from the time the den is detected through June 30.
- While the provision for the den site seasonal restriction is expected to provide protection from any prolonged or substantial project-related disturbance during the critical pup-rearing period at early den and/or rendezvous site(s), a similar seasonal restriction will be implemented for activities within one mile of active summer den and/or rendezvous sites from the time the den/rendezvous site is identified through August 31.
- These seasonal restrictions will follow the wolf pack if they move pups to alternate locations and may be lifted if wolf pups are moved more than one mile from project activities.
- Further discussions and coordination with USFWS may result in modified distances or more flexible dates for these Seasonal Restrictions.
- These seasonal restrictions will be implemented unless there are topographic features, terrain, or other factors (proximity to high-use road systems or recreation areas, topography or other supported rationale) that clearly separates the noise- or smoke-generating activity from the den or rendezvous site(s).

2) Smoke generating activities:

Activities that generate smoke will be managed to avoid smoke disturbance to wolves within one mile of the den/rendezvous site(s), or by agreement of the USFS/USFWS Level 1 team, based on site-specific factors, such as burn prescription or topography. This can be accomplished in several ways, including but not limited to:

A. Use of firing techniques that provide good smoke dispersion and ventilation aloft and/or away from den/rendezvous site(s).
   If effects of smoke cannot be avoided or minimized to an insignificant or discountable level, seasonal restrictions in (1) will apply, and prescribed burning will be conducted outside the seasonal restriction period for wolves.

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